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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,973	08/06/2001	Theodore M. Bloomstein	101328-160	1445

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EXAMINER

SAGAR, KRIPA

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 07/08/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/922,973

Applicant(s)

BLOOMSTEIN ET AL.

Examiner

Kripa Sagar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3 and 6-12 is/are rejected.
- 7) ☒ Claim(s) 2,4 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Drawings***

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 10/21/02 has been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: References to figure 1 have not been indicated in the text; p.22;l.18 ff and p.28 l.13ff.

Appropriate correction is required.

### ***Claim Objections***

3. Claims 1,6, 12 are objected to because of the following informalities:

Typographic errors.

Cl.1;l.5 should correctly read "repeatedly depositing".

Cl.6; l.3 reads "scanning a beam of radiation to form a spot on the first layer "; it is suggested that a radiation spot is formed *before* the spot is scanned to expose the first layer. The claim should be suitably revised.

Cl.12; l.4 should correctly read " parallel to a preform axis"

Appropriate correction is required.

### ***Double Patenting***

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4. Claim 12 of this application conflicts with claim 19 of Application No. 09/922,974. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "the modulated laser beam spot size" in line 1. There is no prior reference to a modulated laser beam spot in claim 1 from which it depends. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3,6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat.5496683 to Asano in view of prior art admitted by Applicant.

The claims recite a method of modulating the exposure of a multilayered resist and forming a multilayered resist pattern by varying the spot size of a radiation beam during a scanning exposure.

Asano teaches predefining the pattern to be exposed in each layer of a multilayered resist pattern (4;15-19). It teaches repeated deposition and exposure of the resist layers (4;5-14). Asano teaches that varying the spot size during scanning exposure is known in prior art (2;46-49). Thus Asano teaches most of the elements of claims 1,6,7.

Asano does not teach using a positive resist (cl.3, 8,10), developing the resist (cl.8), using a novolac resist (cl.11) and heating the resist (cl.9).

Applicant admits that these are known in prior art. The resist materials listed include DNQ/novolac (p.13;l.5); positive tone resists provide advantages that are well known in prior art and development is routinely carried out on patterned photoresist layers (p.13;l.10-20). Applicant notes that a post exposure bake (PEB) is common in resist processing (p.19;l.1-2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the materials and processes known in prior art to form a

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multilayered resist pattern as taught by Asano because there is a reasonable expectation of successfully forming the lithographic pattern.

***Allowable Subject Matter***

8. Claims 2,4,5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The claims recite varying the spot size in a predetermined manner. Although Asano suggests varying the spot size the instant method of varying the spot size is unobvious.

***Conclusion***

9. Examiner notes that the claims do not recite the step of treating the surface of the resist layer to modify its properties. On p.3-4 of the specification Applicant expands on the shortcomings of prior art methods including the intermixing of layers due to solvents. Applicant further states "Solvent intermixing *must* (emphasis added) be prevented in the context of the embodiments disclosed herein" (p.22). Applicant should clarify for the record if the instant invention can be practised without surface modification.

10. Applicant's specification emphasizes two invention-streams (a) surface modification, spot size variation and dose modulation by layer and (b) vector scanning, resolution variation from perimeter to interior and dose variation from perimeter to interior. These have not been claimed.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 703-605-4427. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

MH/ks  
June 30, 2003

  
MARK F. HUFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700